

## **Minutes & Slides from Proton Driver RF Meeting June 29, 2004**

*(G.W. Foster)*

### **Subject: More Low Power YIG Coax Tuner Test Results**

Attendees: Dave Wildman, Iouri Terechkine, Jim MacLachlan, Timergali Khabibouline, John Reid, Victor Yarba, Howie Pfeffer, Ralph Pasquinelli, Shreyas Bhat, Ivan Gonin, G.W. Foster.

**\*\* Next Meeting July 6<sup>th</sup> \*\***

### **MINUTES**

1) Bob Kustom's presentation on the 325 MHz Linac RF system parameters was deferred until next week.

2) Dave Wildman presented more test results from the coax style ferrite tuner (described in last week's minutes). Increasing the number of ½" thick cores from 5 to 10 doubled the phase shift as expected. At high frequencies (800 MHz and above) and low bias fields (< ~1kG) the 10-core tests had some interesting mode behavior that Dave is still investigating.

The YIG Ferrite rings from Ferrite Dometic have been tested. At low frequencies (325 MHz and 433 MHz) the Dometic cores have similar properties to the TCI cores and somewhat lower losses. Seven or eight rings (3.5"-4" total ferrite length) are required to obtain the 90-degree phase shift at these frequencies.

At 1300 MHz the Dometic cores have higher losses and different mode structures at lower solenoid currents. However both vendors' samples produce 90 degrees of useable phase shift (losses ~0.1dB or less) with 5 cores (2.5" total ferrite length) in the shorted stub at 1300 MHz.

Dave's measurements are at:

[http://tdserver1.fnal.gov/8gevlinacPapers/Meeting\\_Minutes/RF/Coax\\_Stub\\_Reflection\\_Data\\_Wildman\\_June\\_29.xls](http://tdserver1.fnal.gov/8gevlinacPapers/Meeting_Minutes/RF/Coax_Stub_Reflection_Data_Wildman_June_29.xls)

3) We are attempting to formulate a plan to prototype the front end of the 325 MHz proton driver linac. The current concept is to convert three of the 200 kW RF stations left over from the PET project for use at 325 MHz, copy the SNS H- source and the 324 MHz 3 MeV RFQ developed for JHF, and power the first cryomodule (~20 single-spoke halfwave SCRF resonators) by splitting the power from one 200kW RF source using a 10:1 radial combiner and the ferrite shifters. The goals of the R&D would be:

- a) successful demonstration of a SCRF linac fed more-or-less directly from a medium current (~25 mA) RFQ,
- b) demonstration of the ferrite phase shifters for SCRF cavity control in a demanding (very low beta, pulsed RF) situation,
- c) verifying the 9 Tesla superconducting solenoids used for beam focusing can peacefully coexist with the SCRF resonators
- d) demonstrating the emittance expected from the of the front-end linac for the Proton Driver, in advance of project approval.

*The minutes of the RF meetings are online at:*

[http://tdserver1.fnal.gov/8gevlinacPapers/Meeting\\_Minutes/RF/Index.html](http://tdserver1.fnal.gov/8gevlinacPapers/Meeting_Minutes/RF/Index.html)